

## OCCURRENCE OF LEAF-MINING DIPTERA IN CULTIVATED CROPS

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## Abstract

Two species of Drosophilidae, *Drosophila busckii* Coquillett and *Scaptomyza australis* Malloch, and one species of Agromyzidae, *Phytomyza syngenesiae* (Hardy) were reared from samples of cultivated crops from the Werribee district, Victoria. A number of parasitic hymenoptera were also reared from the dipterous pupae. These included *Phaenocarpa (Asobara) persimilis* (Papp) (Braconidae: Alysiinae) and two chalcids, *Hemiptarsenus semialbiclava* (Girault) (Eulophidae) and *Trigonogastrella* sp. (Pteromalidae).

## Introduction

In August 1980, unusual damage was observed in leaves of lettuce (*Lactuca sativa* L., Compositae) being grown in market gardens at Werribee, near Melbourne, Victoria. The leaves showed evidence of crinkled depressions on the upper surface. Eggs were found inserted under the epidermis, on the under surface of the leaf, beneath the depressions.

The leaves were placed in tubes with their stems in water, covered with a large plastic bag, and incubated at 25°C. After two days leaf-mining was observed, and after one week the first flies were collected and identified as *Drosophila busckii* Coquillett.

In September, further samples of mined leaves were taken from artichoke (*Cynara scolymus* L., Compositae), chicory (*Cichorium intybus* L., Compositae), endive (*Cichorium endivia* L., Compositae) and Cos (*Lactuca sativa* L., Compositae). *D. busckii* and the agromyzid *Phytomyza syngenesiae* (Hardy) emerged from artichoke. The parasitic hymenoptera *Phaenocarpa (Asobara) persimilis* (Papp), *Hemiptarsenus semialbiclava* (Girault) (Eulophidae) and *Trigonogastrella* sp. (Pteromalidae) emerged from pupae of dipterous leaf miners in artichokes. The flies *Scaptomyza australis* Malloch (Drosophilidae) and *P. syngenesiae* as well as the parasites *P. (Asobara) persimilis* and *H. semialbiclava* emerged from endive. *P. syngenesiae* and *P. (Asobara) persimilis* emerged from pupae of unidentified dipterous leaf miners in cos and milkthistle.

In early October further samples of mined leaves were taken from spinach (*Spinacia oleracea* L., Chenopodiaceae); the emerging insects were *S. australis* and *P. (Asobara) persimilis*.

## Discussion

*D. busckii* has not been previously recorded leafmining in plants (Bock pers. comm.), nor has *S. australis* been recorded previously as a leafminer on cultivated Compositae or Chenopodiaceae (Bock pers. comm.). The leaf miner *Scaptomyza flaveola* (Meig.) has been found in cultivated brassicas in Tasmania (Hardy *et al.* 1981), and members of the genus are generally considered to be pests of only Cruciferae in the northern hemisphere (Bock pers. comm., Hering 1951).

*P. syngenesiae* is widely distributed in temperate zones of both hemispheres and damages many cultivated composites, but damage occurs to

a lesser extent in Australia (Spencer 1973). It is considered to be a native of Europe and was first recorded in Australia from cinerarias in Brisbane (Kleinschmidt 1970). Queensland host records are all confined to the family Compositae (Kleinschmidt 1970) and lettuce is considered one of its most favoured food plants in England (Spencer 1973).

The braconid *P. (Asobara) persimilis* is known to be parasitic on *Drosophila melanogaster* (Meig.) (Papp 1977) but, although it is thought to be a common parasite of *D. melanogaster* in Victoria, it has not been previously recorded as a parasite of dipterous leaf miners (Prince pers. comm.).

The parasites *Hemiptarsenus* sp. and *Trigonogastrella* sp. have been recorded in Australia as parasites of *P. syngenesiae* (Kleinschmidt 1970). *H. semialbiclava* is a widespread species commonly found in Tasmania and south-eastern Australia (Naumann pers. comm.).

The leaf-mining damage was severest in August and early September, particularly in lettuce and artichoke, but declined later in the season, possibly due to parasite activity. There did not appear to be any other suitable breeding sites for the two drosophilid species in the vicinity of the crop and there was no evidence of any prior damage which could have allowed secondary infestation by *D. busckii* and *S. australis*.

Lettuce had leaf-mining damage from as early as the 2-3 leaf stage which in some cases prevented further growth of the plant. Artichokes seemed little affected in terms of yield, despite extensive leaf mines in the lower leaves of the plants.

It is interesting to note that leaf-mining activity by *D. busckii* and *S. australis* has not been recorded previously. Either these species have recently extended their host range or, more likely, previous activity by these two species has not been observed. It remains to be seen whether these two species continue to damage crops of economic importance and whether control measures for dipterous leaf miners in crops in the area may have to be implemented. Some farmers concerned with the extent of the damage attempted chemical control, but without apparent result.

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